

Hibbertia circinata (Dilleniaceae: subgen. *Hibbertia*), a new species from south-eastern New South Wales

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Abstract

Hibbertia circinata K.L.McDougall & G.T.Wright (Dilleniaceae: subgen. *Hibbertia*), a rare, geographically restricted species, is described as new. It is compared with *H. linearis* DC. and *H. saligna* DC., and its ecology and conservation status are discussed.

Introduction

During recent recovery work in far south-eastern New South Wales on the endangered mallee *Eucalyptus imlayensis* Crisp & Brooker, a *Hibbertia* was collected with sessile flowers, simple hairs and three glabrous carpels surrounded by relatively few stamens. Collections with these features from the summit area of Mt Imlay have variously been determined as *H. sp.*, *H. linearis* and *H. saligna*.

Hibbertia linearis DC. is considered either a species complex or a variable species with several distinct geographic races (Nano 1996). In its broadest concept, it is regarded as occurring in a range of habitats from the South Coast of New South Wales to the Central Queensland coast, and inland to the western slopes of the Great Dividing Range. Four varieties are recognised in Queensland, distinguished mainly by leaf shape, sepal length and stamen number: var. *linearis*, var. *floribunda* Benth., var. *grandiflora* Benth., and var. *obtusifolia* (DC.) A.Gray. (Queensland Govt., accessed 26 Oct 2017). Varieties are not recognised in New South Wales, and var. *obtusifolia* is treated at species rank (*H. obtusifolia* DC.) in New South Wales, the Australian Capital Territory, Victoria and Tasmania. Like *H. linearis* itself, *H. obtusifolia* consists of several more-or-less discrete entities perhaps warranting formal recognition (e.g. Harden and Everett 1990) but is distinguished from *H. linearis* and related taxa in having more than 30 stamens. Nano (1996) examined the variability of the *H. linearis* / *H. obtusifolia* complex and concluded that some geographically isolated populations could be regarded as distinct taxa based on morphology, but didn't formally recognise these.

In its current concept (Harden and Everett 1990), *Hibbertia saligna* DC. occurs mainly in moist gullies of the Blue Mountains with apparent outliers in southern (Mt Imlay, Budawang Range) and northern NSW (near Torrington).

Further examination of collections of *Hibbertia linearis* and *H. saligna* at CANB, MEL and NSW explained past confusion in the determination of the Mt Imlay entity. It resembles both species in having three glabrous carpels, fewer than 30 stamens and in some leaf characters. It shares non-glabrous sepals and oblanceolate leaves with *H. saligna* and sepal and petal dimensions with *H. linearis*, but differs in many other characters from both recognised taxa. Here, we describe it at species rank and provide notes on its conservation status, abundance and habitat. Such recognition should assist in its long-term protection as the species is very restricted geographically and possibly threatened by the root rot pathogen *Phytophthora cinnamomi* Rands, which is known from the summit of Mount Imlay (McDougall and Summerell 2003).

Hibbertia circinata K.L.McDougall & G.T.Wright, *sp. nov.*

Differs from *Hibbertia linearis* (including its named varieties) by having villous stems and young branches, relatively long and broad (to 55 mm long and 12 mm wide), oblanceolate leaves that are pubescent on both surfaces, larger petals (to 13 mm long) and fewer stamens. Differs from *H. saligna* in having smaller sepals (with hairs not covering the entire surface) and petals, and fewer stamens.

Type: Australia: New South Wales: South Coast: Near summit of Mt Imlay, below rocky knoll at northern end of ridge, K.L. McDougall 1458 & G.T. Wright, 27 Oct 2016 (holotype: CANB902003; isotypes NSW, MEL).

Shrubs 1–1.5 m tall, with several to many ±erect stems, pubescent with simple, spreading to subappressed, straight, crisped or coiled hairs to 1.25 mm long (rarely to 2 mm long around leaf bases); new growth villous, vestiture persistent to lower branches. **Leaves** sessile with broad, partly stem-clasping bases which remain when the lamina separates at a distinct abscission line; lamina oblanceolate (or occasionally oblong to almost spatulate), entire (or rarely, irregularly toothed near apex), 15–55 mm long, 5–10(–12) mm wide, discolorous; adaxial surface dark green, pubescent, with semi-appressed hairs ranging from tightly coiled (to 0.2 mm diameter) to curled or ±straight, mostly to 0.5 mm long, but up to 2.5 mm long towards base and margin, abaxial surface pale grey-green, with hairs similar to those on adaxial surface but usually less appressed, apex obtuse, but the midrib protruding as a straight or recurved callus point to 1 mm long; margins flat *in vivo*, but often recurving on drying. **Flowers** apparently axillary, solitary (rarely paired), sessile, subtended by 2–4 hypsophylloids (*sensu* Toelken 2000), 3–12 mm long, grading toward normal leaves at the base. **Sepals** 5, ovate to obovate, obtuse to subacute, sometimes minutely apiculate, 5–6.5 mm long and 2.5–3.5 mm wide; outer 3 sepals sparsely to densely pubescent with simple hairs on both surfaces, at least distally but not on hyaline margins, c. 0.5 mm wide; inner 2 sepals usually slightly longer than outer sepals, glabrous or with a few scattered hairs distally on outer surface. **Petals** 5, yellow, obovate, 9–13 mm long, 7–11 mm wide, broadly emarginate, glabrous. **Stamens** 9–13, surrounding carpels, ±equal in length; filaments c. 1.5 mm long, free; anthers ±rectangular, c. 1.0 mm long, obtuse, dehiscing by terminal slits c. 0.5 mm long and extending down lateral margin for up to c. 0.2 mm. **Staminodes** absent. **Carpels** 3, laterally compressed, glabrous; style divergent, flattened, 1.0–2.0 mm long. **Ovules** 2 per carpel. Fruit not seen. Flowering has been observed at most times of the year but seems most prolific in spring. **Figs 1, 2.**

Additional specimens examined: AUSTRALIA: NEW SOUTH WALES: South Coast: Mt Imlay, summit ridge, 20 km SW of Eden, I.R. Telford 6760, 25 Oct 1977 (CANB); Mt Imlay National Park, about 150 m S of the summit of Mount Imlay, J.D. Briggs 1965 & D. Albrecht, 17 Jul 1986 (CANB); Mount Imlay National Park, summit ridge of Mt Imlay, A.M. Lyne 1465, 1 Sep 1994 (CANB); Mt Imlay summit, 40 km SW of Eden via Burrawang Road, J. Knight 489, 26 Sep 1996 (CANB); Mt Imlay, northern ridge of peak, just off summit walking trail, E. Hearder 59, 16 Jun 1999 (CANB); near summit of Mt Imlay, K.L. McDougall 676, 31 Oct 1999 (CANB); Mt Imlay, approximately 500 m NE of trig, S. Pedersen 779 & S. Donaldson, 12 May 2005 (CANB); Mount Imlay National Park, Mt Imlay summit, P. Carmen 329, D. Taylor, C. Hook & K. McDougall, 9 May 2007 (CANB); 100 m N of trig station on summit ridge of Mt Imlay, G. Errington 813, 20 Sep 2011 (NSW); Mt Imlay, SW of Eden, on rocky ridge north of summit, K.L. McDougall 1457 & G.T. Wright, 27 Oct 2016 (CANB); Mt Imlay, SW of Eden, below cliff north of summit, K.L. McDougall 1458 & G.T. Wright, 27 Oct 2016 (CANB).

Distribution: Known only from the summit area of Mt Imlay, south-west of Eden on the South Coast of New South Wales (Fig. 3).

Habitat: Occurs in shrubby woodland dominated by *Eucalyptus sieberi* with a diverse understorey including *Boronia imlayensis* Duretto, *Oxylobium ellipticum* (Vent.) R.Br., *Xanthorrhoea australis* R.Br., *Tetratheca subaphylla* Benth., *Dillwynia glaberrima* Sm., and *Amperea xiphoclada* (Spreng.) Druce. A few plants grow beneath the canopy of the endangered mallee *E. imlayensis* on the eastern face of Mt Imlay and several grow beneath *E. fraxinoides* H.Deane & Maiden below the northern edge of the summit ridge. The species occurs in a very narrow elevation range between about 800 and 850 m a.s.l.



Fig. 1. *Hibbertia circinata* near the summit of Mt Imlay, south-eastern NSW. Note the villous hairs at the bases of new leaves and the irregular teeth at the apex of some leaves. Such non-entire leaves were seldom observed (unvouchered specimen). Photo: G. Wright.

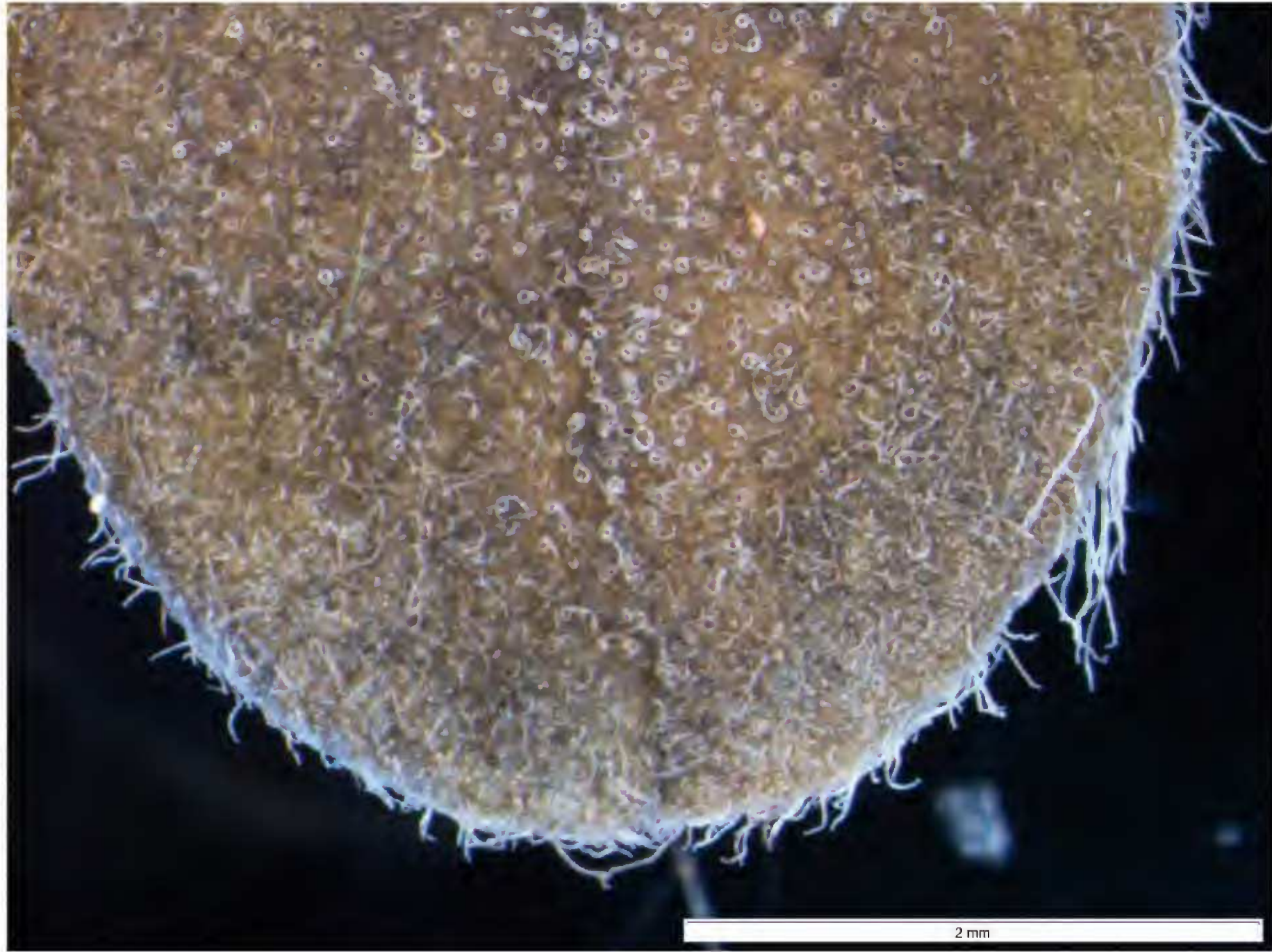


Fig. 2. Hairs on the upper leaf surface beginning to uncoil. Note the longer \pm straight hairs on leaf margins. K.L. McDougall 1457 & G.T. Wright, (CANB)

Conservation status: The total population is estimated to be about 200 plants. They occur predominantly in the last part of the summit ridge not infested with *Phytophthora cinnamomi*. Although their susceptibility to *P. cinnamomi* is unknown, their absence from the summit area where all *Xanthorrhoea australis* have died within the last 20 years, and where species richness is relatively low, is suggestive that they are susceptible. The susceptibility of *Hibbertia* is apparently variable across the genus, but a number of species have been reported as ‘Highly Susceptible’ to *P. cinnamomi* (O’Gara et al. 2005). Based on IUCN criteria, the species can be regarded as critically endangered (IUCN 2012).

Etymology: The epithet refers to the tightly coiled hairs, which are particularly evident on young leaves. Most of these ‘uncoil’ with age to become the characteristic spreading to appressed indumentum, but some are usually evident on all but the oldest vegetative parts. Although coiled hairs may be present on other species of subgen. *Hibbertia*, those of *H. circinata* create a distinctive pattern of \pm regularly arranged open circles on the upper surface of many young leaves.

Notes: *Hibbertia circinata* differs from *H. linearis* in its villous rather than shortly tomentose, often soon-glabrous stems and young branches, its broader leaves with conspicuous persistent indumentum (those of *H. linearis* being glabrous or glabrescent), larger petals (to 13 mm long, compared with c. 10 mm long in *H. linearis*) and fewer stamens (9–13 compared with 15–25 in *H. linearis*). The nearest known locality for *H. linearis* (and the southern-most extent for that species) is in coastal hinterland west of Pambula (CANB867000) about 30 km north of Mt Imlay. Some forms of the variable *H. obtusifolia* superficially resemble *H. circinata* but the leaves of *H. obtusifolia* are usually concolorous, glabrous or glabrescent. The stamen number for *H. obtusifolia* (>30 per flower) exceeds that of both *H. circinata* and *H. linearis*. *Hibbertia circinata* differs from *H. saligna* in having pubescent upper leaf surfaces, smaller, partly glabrous sepals (to 6.5 mm long, compared with 12–16 mm long and silky in *H. saligna*), and fewer stamens (9–13 compared with 20–35 in *H. saligna*). With *H. saligna* collections from Mt Imlay now being assigned to *H. circinata*, the southern limit for *H. saligna* is in hinterland forest north-west of Batemans Bay.

The term hypsophylloid was used by Toelken (2000) to refer to floral leaves, which in *Hibbertia* often grade into normal leaves with the point of separation being difficult to define.

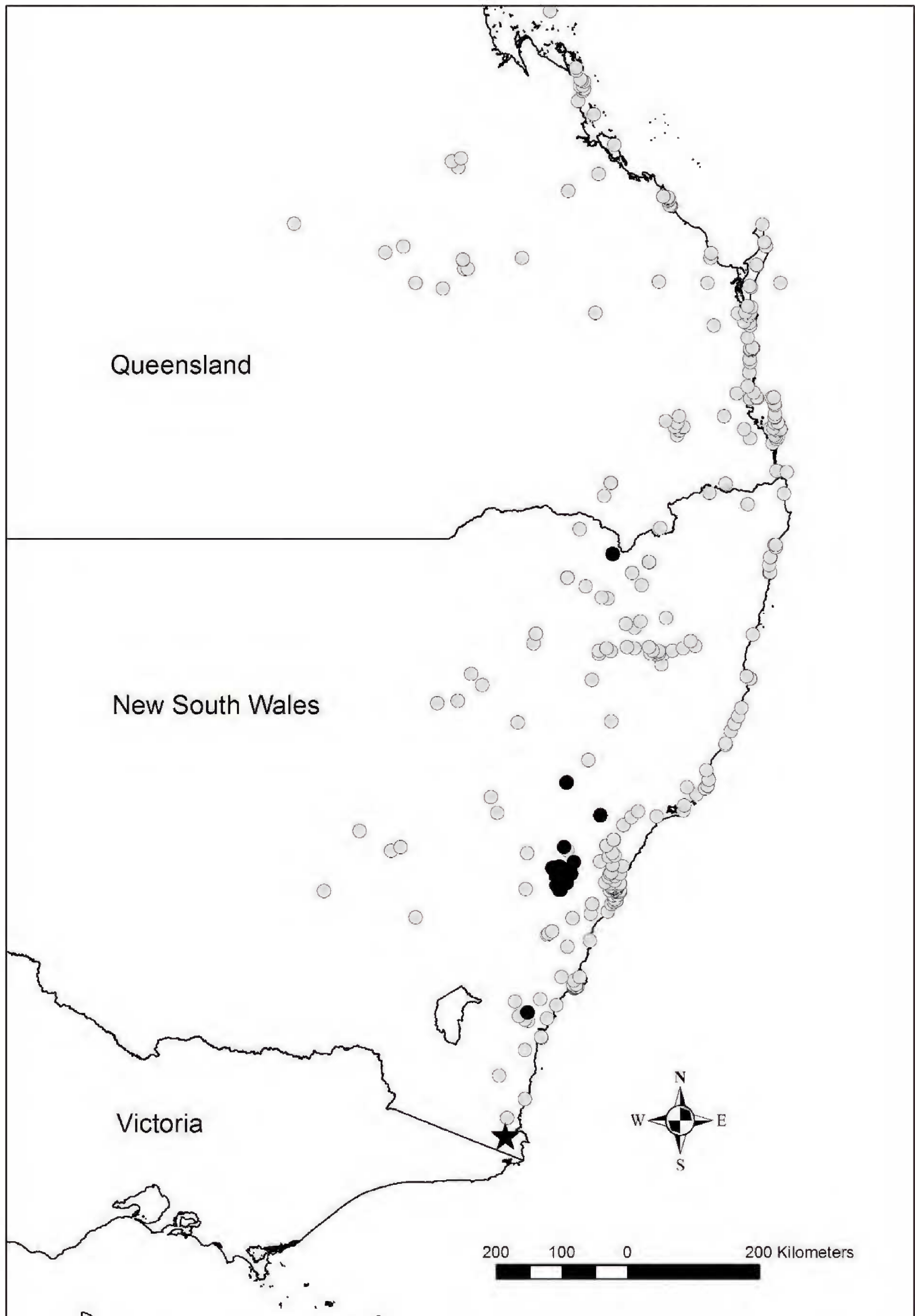


Fig. 3. Location of *Hibbertia circinata* in far south-eastern New South Wales (★). Records of *H. linearis* are shown as grey circles and *H. saligna* as black circles.

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References

- Harden G, Everett J (1990) *Hibbertia*. New South Wales Flora Online. <http://plantnet.rbgsyd.nsw.gov.au> (accessed 3 Nov. 2017)
- IUCN (2012) IUCN Red List Categories and Criteria: Version 3.1, 2nd edn. IUCN: Gland, Switzerland and Cambridge, United Kingdom.
- McDougall KL, Summerell BA (2003) The impact of *Phytophthora cinnamomi* on the flora and vegetation of New South Wales – a re-appraisal. In 'Phytophthora in Forests and Natural Ecosystems'. 2nd International IUFRO Working Party 7.02.09 Meeting, Albany, Western Australia, October 2001. Eds. JA McComb, GESTJ Hardy and IC Tommerup; pages 49-56. (Murdoch University Print: Murdoch, Western Australia).
- Nano C (1996) Taxonomy and reproductive biology in *Hibbertia* Andr. Subsection Subsessiles Benth. Honours Thesis, University of New England
- O’Gara E, Howard K, Wilson B, Hardy GESJ (2005) Management of *Phytophthora cinnamomi* for Biodiversity Conservation in Australia. (Department of Environment and Heritage: Canberra)
- Queensland Government; Science, Information Technology and Innovation, Names, distribution and status of Queensland vascular plants. <https://data.qld.gov.au/dataset/census-of-the-queensland-flora-2017/resource/5d70f77b-bf52-4846-94b1-abbcd70ab550> accessed 25 Oct. 2017
- Toelken HR (2000) Notes on *Hibbertia* (Dilleniaceae). 3. *H. sericea* and associated species. *Journal of the Adelaide Botanic Gardens* 19: 1-54.

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